Trichinellosis (**Trichinella** *spiralis)*

(Also known as Trichinosis)

October 2003

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Trichinosis is caused by *Trichinella spiralis,* a parasitic intestinal roundworm whose larvae migrate to and become encapsulated in the muscles. There are multiple species of *Trichinella* capable of causing infection in mammals, but *T. spiralis* is the most common cause of human infection.

B. Clinical Description and Laboratory Diagnosis

Trichinosis can range from asymptomatic to fatal, depending on the infective dose. Most infections in the United States are asymptomatic. In the week following ingestion of infected meat, a patient may experience nausea, vomiting, diarrhea and abdominal discomfort due to intraintestinal activities of the adult worms. A sudden onset of muscle soreness and pain, fever, edema of the upper eyelid and urticarial rash, 2 to 8 weeks after ingestion can follow, as larvae migrate into muscle tissue. Eye pain, photophobia, thirst, profuse sweating, chills, and weakness may also occur. Recurring high fever (as high as 104°F) usually stops after 1 to 6 weeks. In the most severe infections, cardiac and neurologic complications, sometimes leading to death, may occur in the 3rd to 6th week.

Laboratory tests will show a rapid increase in eosinophil levels in blood. Serological tests and muscle biopsy can confirm the diagnosis.

C. Reservoirs

Swine, dogs, cats, horses, rats and many wild animals, such as bear, wolf, wild boar, fox and Arctic marine mammals, can serve as reservoirs for *Trichinella*.

D. Modes of Transmission

Transmission occurs by ingestion of raw or undercooked meats containing *Trichinella* larvae. Pork and pork products are the most likely source. Beef products, which may become inadvertently adulterated with raw pork during processing, may also be a source. As many as 30% of domestic cases of trichinosis are thought to be related to the ingestion of meat from wild game animals. There is no person-to-person spread of trichinosis.

E. Incubation Period

Gastrointestinal symptoms may appear within a few days of infection; appearance of systemic symptoms ranges from 5 to 45 days. The usual incubation period is 8 to 15 days. If large numbers of cysts are ingested, symptoms may occur more rapidly.

F. Period of Communicability or Infectious Period

Trichinosis is not transmitted directly from person-to-person. Animal hosts may remain infective for months, and meat from these animals remains infective until the larvae are killed by sufficient cooking, freezing or irradiation.

G. Epidemiology

Trichinosis occurs worldwide and affects people of all ages. Depending on local customs regarding eating pork or undercooked meats, the incidence of disease is variable. In the United State, the numbers of reported cases of trichinosis are declining. In 1998, a total of 19 were reported. In New Jersey in the last 12 years, no cases were reported.

2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition

CASE CLASSIFICATION

A. CONFIRMED

A clinically compatible case, **AND**:

- Demonstration of *Trichinella* larvae in tissue obtained by muscle biopsy, **OR**
- Positive serologic tests for *T. spiralis*.

NOTE: In an outbreak situation, at least one case must be laboratory-confirmed. Associated cases are defined as individuals that have shared the epidemiologically implicated meal or ate an epidemiologically implicated meat product and have either a positive serologic test for trichinosis or a clinically compatible illness.

B. PROBABLE

Not used.

C. POSSIBLE

Initially reported on the basis of clinical diagnosis, until confirmation is obtained; no possible case classifications are retained.

B. Laboratory Testing Services Available

The NJDHSS Public Health and Environmental Laboratories (PHEL) will perform serological testing for the presence of antibodies for *T. spiralis.* For additional information, contact the Special Immunology Laboratory at 609.292.5819.

3) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify sources of public health concern (*e.g.,* undercooked *Trichinella*-infected pork being sold at a restaurant) and to stop transmission from such a source.
- To identify and control outbreaks.

B. Laboratory and Healthcare Provider Reporting Requirements

The New Jersey Administrative Code (N.J.A.C. 8:57-1.8) stipulates that laboratories report (by telephone, confidential fax, over the Internet using the Communicable Disease Reporting System [CDRS] or in writing) all cases of trichinellosis to the local health officer having jurisdiction over the locality in which the patient lives,

or, if unknown, to the health officer in whose jurisdiction the health care provider requesting the laboratory examination is located. The health care providers must report all cases of trichinellosis to the local health officer having jurisdiction over the locality in which the patient lives.

C. Local Department of Health Reporting and Follow-Up Responsibilities

1. **Reporting Requirements**
The New Jersey Administrative Code (N.J.A.C. 8:57-1.8) stipulates that each local health officer must report the occurrence of any case of trichinosis, as defined by the reporting criteria in Section 2 A above. Current requirements are that cases be reported to the NJDHSS Infectious and Zoonotic Diseases Program (IZDP) using the CDS-1 form. The report may also be filed electronically over the Internet using confidential and secure CDRS.

2. **Case Investigation**
   a. It is the local health officer's responsibilities to complete the CDS-1 form by interviewing the patient and others who may be able to provide pertinent information to rule out a possible outbreak. Much of the information can be obtained from the patient's healthcare provider or the medical record. For confirmed cases, the CDC Trichinosis Surveillance Case Report form should also be completed.

   b. Use the following guidelines for assistance in completing the form:
      1) Accurately record the demographic information, occupation, whether hospitalized (including dates), date of symptom onset, symptoms and other medical information, healthcare provider information, and outcome of disease (*e.g.,* recovered, died). Please include a full name and address for the case.
      2) When asking about exposure history, use the incubation period range for trichinellosis (5–45 days). Specifically, focus on the period beginning a minimum of 5 days prior to the patient's symptom onset date back to no more than 45 days before onset for the following exposures:
         a) Food(s) derived from pork.
         b) Non-pork food(s), including beef, wild game, dried jerkys, and other food(s).
      3) If possible, record any restaurants at which the patient ate, including food item(s) and date consumed. If you suspect that the patient became infected through food, use the Patient Food History Listing, Patient Symptoms Line Listing and Food-Specific Attack Rate Table Worksheet forms to facilitate recording additional information
      4) If there have been several attempts to obtain patient information (*e.g.,* the patient or healthcare provider does not return calls or does not respond to a letter, or the patient refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as possible. Please note on the form the reason why it could not be filled out completely. **If CDRS is used to report, enter the collected information into the "Comments" section.**

After completing the case report form, it should be mailed (in an envelope marked "Confidential") To the NJDHSS IZDP, or the report can be filed electronically over the Internet using the confidential and secure CDRS. The mailing address is:

NJDHSS
Division of Epidemiology, Environmental and Occupational Health
Infectious and Zoonotic Diseases Program
PO Box 369
Trenton, NJ 08625-0369

c. Institution of disease control measures is an integral part of case investigation. It is the local health officer's responsibility to understand, and, if necessary, to institute the control guidelines listed below in Section 4, "Controlling Further Spread."

4) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements

None.

B. Protection of Contacts of a Case

None.

C. Managing Special Situations

Reported Incidence Is Higher than Usual/Outbreak Suspected

If the number of reported cases of trichinellosis in a city/town is higher than usual, or if an outbreak is suspected, investigate to determine the source of infection and mode of transmission. A common vehicle (e.g., food derived from pork or game meat) should be sought and applicable preventive or control measures should be instituted (*e.g.,* removing an implicated food item from the environment). Consult with the NJDHSS IZDP at 609.588.7500. The Program staff can help determine a course of action to prevent further cases and can perform surveillance for cases across jurisdictions that may be difficult to identify at a local level.

D. Preventive Measures

Environmental Measures

Implicated food items must be removed from the environment. A decision about testing implicated food items can be made in consultation with the Infectious and Zoonotic Diseases Program and the Food and Drug Safety Program (FDSP). The FDSP can help coordinate pickup and testing of food samples. If a commercial product is suspected, The FDSP will coordinate follow-up with relevant outside agencies (e.g., FDA, USDA). The FDSP may be reached at 609.588.3123.

Note: The role of the FDSP is to provide policy and technical assistance with the environmental investigation such as interpreting the New Jersey Food Code, conducting a hazardous analysis and critical control points (HACCP) risk assessment, initiating enforcement actions and collecting food samples.

The general policy of the PHEL is only to test food samples implicated in suspected outbreaks, not in single cases (except when botulism is suspected). The health officer may suggest that the holders of food implicated in single case incidents locate a private laboratory that will test food or store the food in their freezer for a period of time in case additional reports are received. However, a single confirmed case with leftover food consumed within the incubation period may be considered for testing.

Personal Preventive Measures/Education

To avoid future exposures, individuals should be made aware of the following:

- Thoroughly cook pork, pork products and wild game until the meat is no longer pink. This can be achieved by allowing sufficient cooking time so that all parts of the meat reach an internal temperature of at least 160°F (71°C). Freezing pork less than 6 inches thick for 20 days at 5°F will kill the larvae, but freezing wild game meats may leave some larvae alive.
- Grind pork in a separate grinder and thoroughly disinfect the grinder between different products.
- Hunters should thoroughly cook all meats from wild animals. Meat products should be processed by heating, freezing or irradiation prior to drying or smoking for jerky.

- Cook any meat fed to pigs or other animals.
- Hogs should not be allowed to eat uncooked carcasses of other animals, including rats, which may be infected with trichinosis.
- Be aware that curing (salting), drying, smoking, or microwaving meat does not consistently kill infective larvae.
- Individuals known to have recently ingested the same product as the case being investigated should consult with their healthcare provider regarding treatment options.

ADDITIONAL INFORMATION

A *Trichinosis Fact Sheet* can be obtained at the NJDHSS website at <www.state.nj.us/health.>

The formal CDC surveillance case definition for trichinosis is the same as the criteria outlined in Section 2A of this chapter. CDC case definitions are used by state health departments and CDC to maintain uniform standards for national reporting. Always refer to Section 2 A of this chapter for the criteria in reporting a case to the NJDHSS.

REFERENCES

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